

Of these twenty Greenland and Grinnell-Land Echinoderms,

Fourteen are common to America and Europe ;

Three are known as American and *not* European ;

Two are known as European and *not* American ;

One now first recorded from Grinnell Land only.

Analysis similarly shows that fourteen out of the twenty are Grinnell-Landic. And of these,

Eleven are common to America and Europe ;

Two are known as European and *not* American ;

One from Grinnell Land only.

Reasoning from present information, the writers are of opinion that the character of the Echinifauna under consideration is the effect of local modification acting upon a great polar distribution rather than of intercontinental emigration simply.

LVIII.—*Description of a new Species of Foraminifera* (*Rotalia spiculotesta*). By H. J. CARTER, F.R.S. &c.

[Plate XVI.]

EVER since my description and illustrations of the structure of the shell of *Operculina arabica* were published ('Annals,' 1852, vol. x. p. 161, pl. iv.), I have felt certain that the spiculiform bodies therein described and figured were integral parts of the test, and not occasioned by any particular arrangement of its canal-system as stated by Dr. Carpenter, any more than the bricks of a house are dependent for their form on the position of the gas- and water-pipes. How far I was justified in making this assertion may be learnt from the following description of this new species of Foraminifera.

Rotalia spiculotesta, n. sp. (Pl. XVI. figs. 1-3.)

Parasitic, sessile, flat, subcircular, with irregular margin; colour dark brown in the centre, where the chambers are still filled with dried sarcode, becoming snow-white towards the margin, where they are more or less emptied by its contraction. Chambers commencing from a slightly raised, central, spherical, embryonal or primary cell, in regular spiral succession, soon becoming most irregular both in size and shape, when the spire can be no longer traced, as they descend outwards to a margin so irregularly undulating as to present in some parts narrow conical processes, while in others they are wide and round. Aperture not seen, but probably inferior, as none could be observed above. Test entirely composed of round,

smooth, fusiform, transparent, solid, calcareous spicules, whose ends are sharp-pointed or round; varying in size from those of the primary chambers, which are about 2 by $\frac{1}{2}$ -1800th, to those of the outer ones, which are 5 by 2-1800ths inch in their greatest diameters respectively; arriving abruptly at their largest dimensions in the third whorl of chambers, beyond which they do not appear to increase in size (Pl. XVI. fig. 2); the whole so interwoven and cemented together by a minutely areolated, calcareous, crystalline, but white-looking structure (fig. 3, c), as to form a thin, delicate wall to each of the chambers, whose cavities respectively are either partially empty or filled with the dried animal, as before stated (fig. 2, a, b, c). Size of entire test about 1-15th inch in horizontal diameter (fig. 1); vertical diameter almost inappreciable from its extreme thinness and the adherence of the lower surface to the object on which it has grown; diameter of the primary or embryonal chamber 2-1800ths of an inch.

Hab. Marine, on the base of *Oculina rosea* = *Stylaster sanguineus*.

Loc. East Oceania.

Obs. This remarkable Foraminifer, of which I have only one specimen, was found accidentally on a small fragment of the base of a specimen of *Stylaster sanguineus* in the British Museum, and therefore, if sought for specially, will probably (like the fixed Rotalians generally) be met with more or less abundantly about similar objects from the same region.

The rotalian characters and spicular composition of the test respectively suggest the name; but being adherent to the surface on which it is situated, the position of the aperture, like that of *Rotalia*, is inferred to be inferior, as none can be observed on the upper part. There seems to be no particular arrangement of the spicules, which as often cross each other as they are seen to be only one layer deep, and, with reference to their relative position, lie in all possible directions, seldom appearing above the level of the surface, although evincing, by the occasional projection of one end, or their entire separation about some part which has been broken (like that of the chamber, fig. 2, a), the form above described; while the largest belonging to the outer whorls of the chambers, being in length more than twice the diameter of the central or embryonal cell, which is composed of similar spicules only much more minute, show that their size has been increased with the growth of the test, and therefore that they have been formed by the animal, and not brought to it from some other organism. Moreover they are precisely like those seen in the marginal cord and over the septal spaces of

Operculina arabica (l. c. fig. 4, and 'Ann.' 1861, vol. viii. pl. xvii. figs. 10, 11), where they are cemented together by the same kind of areolar calcareous structure, whose cells are so minute, that they can only be just seen in reflected light under one-sixth-of-an-inch compound power with high ocular; hence its white appearance.

After having described and figured such spicules in the cord of *Operculina arabica* in 1852 ('Ann.' l. c.), Dr. Carpenter, in 1859 (Phil. Trans. p. 25), stated that it was "due to the peculiar manner in which the homogeneous substance of which it (the marginal cord) is composed is traversed by the set of canals that are correctly described by Mr. Carter as forming the marginal plexus." To this I replied in 1861 ('Ann.' l. c. p. 313) that this could not be the case, as in some specimens the spicular structure existed over the septal spaces also, where there is no marginal or any other kind of plexus. Then Dr. Carpenter in 1862 (Introd. to the Study of Foram. p. 257, footnote) rejoined, "So far from finding in this latter statement any reason for modifying my own views, I draw from it additional reason for believing that Mr. Carter has been misled by the method of examination on which he seems to place most reliance."

Here the matter rested with Dr. Carpenter, but not with myself, who, feeling convinced that I was right, could not accept Dr. Carpenter's "views," viz. that solid fusiform bodies such as I have described and figured (l. c.), and of which I still retain the preparation unimpaired, could be formed by a "set of canals." Let any histologist try to conceive how a plexus of canals, however disposed, could afford that continuous surface which would be necessary to form a solid, fusiform, calcareous body like the spicule above described, especially over the septal spaces of *Operculina*, where no such plexus exists!

So much for Dr. Carpenter's "views." Now let the above description of this exquisite little organism, together with the accompanying figure 2 (necessarily much enlarged to show the relative size of the primary or embryonic cell, with the length of the largest spicules), testify to the fact that, not only part, but *the whole* of the test may be formed of such spiculiform bodies held together, as above stated, by minutely areolated calcareous structure; while, at the same time, it recalls to mind the chitinous plates formed by the animal of *Euglypha* itself for its own test, and not the heterogeneous material brought from other localities by the animal of *Lituola* and the arenaceous *Diffugiæ* for their tests respectively.

Budleigh-Salterton, 7th October, 1877.

EXPLANATION OF PLATE XVI.

- Fig. 1.* *Rotalia spiculotesta*, n. sp. Natural size.
Fig. 2. The same, magnified throughout on the scale of 1-24th to 1-1800th inch. *a*, chamber broken open, showing the spicular composition and thin structure of the wall; *b*, cavity of the chamber, showing the spicular structure of the wall from the interior; *c*, dried and contracted sarcodæ of the animal.
Fig. 3. The same, diagram; portion of the wall of a chamber, magnified upon the scale of 1-12th to 1-1800th inch, to show the form of the spicules and areolated calcareous cement. *a*, spicules separate; *b*, spicules crossing each other; *c*, areolated cement.

LIX.—*Descriptions of new Species of Heterocera from Japan.*
 —Part I. *Sphinges and Bombyces.* By ARTHUR G. BUTLER,
 F.L.S., F.Z.S., &c.

[Continued from p. 404.]

Notodontidæ.

33. *Phalera signata*, n. sp.

Primaries above white, irrorated with black, brown, and yellow; a patch of raised white scales closing the cell, and followed by a lunulated oblique brown line from costa to inner margin; a discal irregular series of brown-edged, embossed, white lunate spots, followed by an indistinct greyish belt; a series of black Σ -shaped markings along the outer margin; secondaries fuliginous brown, becoming darker externally and ochraceous or testaceous at abdominal margin; thorax white, mottled with blackish scales; abdomen testaceous, with the anal segments whitish; antennæ ferruginous, with testaceous pencil-like pectinations: wings below of the male testaceous, clouded with brown, body testaceous; female rather sandy yellow than testaceous. Expanse, ♂ 2 inches 5 lines, ♀ 2 inches 11 lines.

♂, Yokohama (*Jonas*); ♀, Hakodaté (*Whitely*).

This species has the aspect of *Dasychira*, but the structure of *Phalera*.

34. *Bireta pallida*, n. sp.

♂ ♀. Primaries pale straw-yellow, with a large, pale brownish internal patch, reaching to the first median branch, and a longitudinal streak of the same colour through the end of the cell; an oblique rounded spot of the ground-colour on the lower discocellular; an oblique sinuated line (angulated